

1                   **BLOOD HEAT CONSERVING TUBE ASSEMBLY**  
2                   **FOR HEMODIALYSIS OR BLOOD TRANSFUSION**

3    **BACKGROUND OF THE INVENTION**

4    **1. Field of the Invention**

5    The present invention relates to a BLOOD HEAT CONSERVING TUBE  
6    ASSEMBLY, particularly to the blood heat conserving for a patient undergo blood  
7    transfusion or hemodialysis process. The device maintains the blood heat during the  
8    external transportation and keeps the patients from hypothermia.

9  
10   **ILLUSTRATION OF THIS INVENTION**

11  
12   **1. THE TECHNICAL SCOPE OF THIS INVENTION**

13           This invention of BLOOD HEAT CONSERVING TUBE ASSEMBLY is  
14   mainly designed to maintain the temperature of blood supply to a certain degree  
15   during the external transportation to keep patients warm during blood transfusion or  
16   hemodialysis without causing hypothermia to the patients.

17   **2. INTENTION OF PRECEDENT TECHNOLOGY AND THIS INVENTION**

18           Either having a hemodialysis performed in a large-scaled hospital or a blood  
19   transfusion in a medical clinic, the blood supply needs to be heated up before it is  
20   transfused to the patients. The body temperature drops because of lack of devices to  
21   maintain the temperature of heated blood supply before it reaches to the patient. The  
22   temperature of blood supply is usually much lower than that of human body. Thus a  
23   blanket is applied to keep patient warm and maintain a comfy position. Or patients  
24   may suffer from hypothermia or death to some extent.

25           However, by only covering a blanket to maintain body temperature in an

1 air-conditioned room is not a good solution to cope with hypothermia problem.

2 Therefore, to increase comfort and prevent hypothermia for patients as well  
3 as to minimize heavy workload for nursing staffs are the intention of this invention.

### 4 5 3. THE CONTENT OF THIS INVENTION

6 The main purpose of this innovation is to provide two decks of hollow tube  
7 assemblies to transport blood supply through the channel of inner tube; and a heated  
8 fluid or air through the channel of outer tube to keep blood supply maintaining at an  
9 appropriate body temperature. Thus, patients are safeguarded against hypothermia.

10 Other objects, advantages and novel features of this invention will be more  
11 apparent from the following detailed description when taken in conjunction with the  
12 accompanying drawings.

### 13 4. BRIEF DESCRIPTION OF THE DRAWINGS

14 Fig. 1 is an exploded perspective view of the blood heat conserving tube  
15 assembly of the present invention;

16 Fig. 2 is a longitudinal cross section view of the assembled blood heat  
17 conserving tube assembly;

18 Fig. 3 is a schematic side plan view showing a distal end of the mediate tube;

19 Fig. 4 is a schematic side plan view showing the interrelationship between the  
20 distal end of the mediate tube and the connector tube; and

21 Fig. 5 is a perspective view of the blood heat conserving tube assembly of the  
22 present invention.

### 23 24 4. DETAILED DESCRIPTION OF APPLICATION

1 Please refer to Fig. 1, this invention of blood heat conserving tube assembly  
2 consists of one mediate tube (1) and two connector sets (2) that connect to each end of  
3 the mediate tube respectively.

4 There is an inner tube (11) inside the outer mediate tube (1). The inner  
5 tube (11) and the outer mediate tube (1) are connected by ribs (12) extending  
6 between the outer periphery of the inner tube (11) and the inner periphery of the  
7 mediate tube (1), which has formed many channels (13) between the inner tube (11)  
8 and the outer mediate (1) tube. Due to the formation of the ribs (12), channels (13) are  
9 defined between two adjacent ribs (12) and which has formed many openings (10)  
10 around each end of inner and outer mediate tubes (11,1) as shown in Fig. 2.

11 Because the two connector sets (2) are substantially the same in structure, the  
12 following description is focused on only one connector set (2) for brevity.

13 Each connector set (2) has a connecting head (21) and an engaging tube (22)  
14 located between connecting head (21) and inner and outer mediate tubes (11, 1).

15 Please refer to Fig. 2. The above-mentioned connecting head (21) actually is  
16 a hollow tube. A connecting tube (211) is extended from the middle of connecting  
17 head (21). In the meantime, a circle of flange (212) is formed on the outer surface of  
18 connecting tube (211).

19 There is a space (221) inside the engaging tube (22). An inlet (222) is opened on the  
20 outer surface of engaging tube (22) and connects to the space (221). An annular  
21 groove (223) located at one side of inner wall of engaging tube (22) corresponds to its  
22 counterpart -- flange (212) of connector head (21); several open spaces extended  
23 from the other side of engaging tube correspond to their counterpart -- extension  
24 pieces (224) of openings (10).

When all the parts of this invention are assembled, the completed structure of BLOOD HEAT CONSERVING TUBE ASSEMBLY is exactly like the picture shown in Fig. 2, 3, 4, and 5. Each extension piece is hollow. When extension piece (224) is inserted into its opening (10), the space (221) inside the engaging tube (22) is connected to the channel (13); because of their counterpart relationship, annular groove (223) and flange (212), connecting head (21) and engaging tube (22) are firmly connected. Since connecting head (21), engaging tube (22) and inner tube (11) are hollow; a passage is formed through these hollow spaces, the blood supply of inner tube (11) successfully runs through.

It is to be noted that, when the assembly of this invention is completed, the space (221) and its channel (13) are connected and surround the blood supply of inner tube (11), the operator should instill fluid, such as air or water, at a specified temperature into the inlet (222). The heat from fluid has a function of increasing and conserving the heat of blood supply. Thus, the temperature is maintained at a steady level. Under this situation, patients receiving blood transfusion won't be endangered under hypothermia.

The variety of fluid adopted in this invention of BLOOD HEAT CONSERVING TUBE ASSEMBLY is quite flexible. Besides, the construction of this invention is very simple, thus, the manufacturing cost reduced substantially.

## 5. BRIEF ILLUSTRATION OF FIGURES

### Figure Part

Fig. 1: A three-dimensional dissected view of this innovation

Fig. 2: A longitudinal cross section view of this innovation

- 1            Fig. 3: A symmetric view of inner and outer tube in this innovation
- 2            Fig. 4: A plane figure of an inserted extension piece of engaging tube
- 3            Fig. 5: A three-dimensional view of an assembled Blood Heat
- 4            conserving Tube Assembly

5

6            Symbols

- |                                     |                        |
|-------------------------------------|------------------------|
| 7            (1) outer mediate tube | (10) opening           |
| 8            (11) inner tube        | (12) rib               |
| 9            (13) channel           | (2) connector set      |
| 10           (21) connecting head   | (211) connecting tube  |
| 11           (212) flange           | (22) engaging tube     |
| 12           (221) space            | (222) intlet or outlet |
| 13           (223) annular groove   | (224) extension piece  |

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